Ch 6.4

**Endoplasmic Reticulum** / **ER** is an extensive network of membranes that accounts for more than half of the total membrane. It also consists of membranous tubules and sacs called **Cisternae**.

* **Smooth ER** gets its name because its surface *lacks* ribosomes and **Rough ER** gets its name because it *does*.
* **ER Lumen** is the internal component of ER that’s separated by the ER Membrane.

**Glycoproteins** make up most secretory proteins.

**Smooth Membrane** Functions:

* Synthesizing lipids
* Metabolism of carbohydrates
* Detoxification of drugs and poisons
  + Note: Detoxification of drugs often means adding a hydroxyl group (-OH) to drug molecules.
* Storage of calcium ions

*Enzymes* of the **Smooth ER** are important to the synthesis of lipids, oils, steroids (Among these steroids in animal cells are sex hormones).

**Rough ER** Function:

* The ribosomes attached:
  + Synthesize proteins
  + Thread into lumen
  + Fold into lumen
  + Transport vesicles to the Golgi
* Grow their own membrane
  + Adds the Proteins and the lipids

**Vesicles** = Tiny sacs made of membrane that can transport stuff into a cell, out of a cell, and within a cell. Aka. A protein Uber

* **Transport Vesicles** are vesicles that are in transit from one cell to another.
* **Vacuoles** are large vesicles derived from endoplasmic reticulum and the *Golgi apparatus*.

After leaving the *ER* *transport vesicles* go to the **Golgi Apparatus** which is a sort of warehouse for proteins.

* A Golgi has Cisternae which are like a flat stack of pancakes / pita bread? (Great analogy btw)
* The Golgi has two sides to it the Cis side and the Trans side. Proteins are dropped off at the Cis side and when the Golgi is done processing and modifying it buds out a vesicle to transport the protein. EX: This is almost like an Amazon warehouse when has a side where products from companies ship it to and a side which after packaging and labeling is given to a delivery driver to be shipped to your home.

**Lysosomes** are a membranous sac of hydrolytic enzymes that many eukaryotic cells use to digest(hydrolysis) macromolecules. EX: The stomach of eukaryotic cells.

* The enzymes found in a Lysosomes need a high Ph environment to function and if the Lysosomes breaks open it no longer functions. PS if enough break the cell can digest itself.
* They also help recycle the cells own organic material in a process called **Autophagy** where a damaged organelle or small amount of cytoplasm becomes surrounded by a double membrane and it dissembles it and releases it into the cytosol.

**Amoebae** are unicellular beings that eat by engulfing things to eat in the process known as **Phagocytosis** is the process of eating a smaller cell or a food molecule. The enzymes inside the Lysosomes digest the food. Digestion products including Simples sugars, amino acids, and other monomers.

* Note: Some human cells use that process! The most notable is the **White Blood Cells** that help defend the body by engulfing bacteria and other invaders.